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THE FLORA OF THE CANTERBURY DUNE SYSTEM, (NEW BRIGHTON - WAIPARA) IN THE 1980'S

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ABSTRACT

The findings of four summer surveys of the flora of the Canterbury (New Brighton - Waipara) dune system are presented. Comments are made on historical changes in flora composition and tables are presented to indicate the distribution and abundance of the extant flora.

KEYWORDS: Canterbury dune system, plant distribution, community history and development.

INTRODUCTION

There is no early account of the sand dune system of the Canterbury coast and we can only surmise what the pre-European settlement vegetation may have been. Certainly modification started at a very early stage of European occupation as coastal areas were included in the early Canterbury runs. The Sandhills Run, secured in 1852, took in the country between the Styx River and the Avon-Heathcote estuary. Other runs to the north included the coastal strip (Acland, 1975). Stocking would have affected susceptable species such as Spinifex hirsutus and pingao (Desmoschoenus spiralis).

An early, undated water colour of the New Brighton dunes, by H. Impey, (he was painting in the 1870's-80's), shows what appears to be pingao in the foreground and another of Whitewash Head, Sumner by W.H. Raworth (1871) indicates scrub and flax on the dunes. Both are held by the Christchurch City Council Robert McDougall Art Gallery.

Plants of the Canterbury sand dunes were first listed by J.F. Armstrong (1869) and J.B. Armstrong (1879) briefly described the littoral zones. Wall (1922, 1953) gave an account of the dune flora and vegetation and Cockayne (1927) described the various associations in general terms. These show that considerable change had taken place between 1850 and 1950. Mason (in Knox 1969) gave the first detailed account of the coast flora and vegetation.

The process of change continues and in this account the emphasis is on the flora and vegetation as it is today. Over the four summers (1979-1982) we have traversed, on foot, the coastal dune system from Sumner to Waipara, and recorded so far as was possible, all plant species present. The total number of species noted was 245, and of these 147 are introduced. Twelve are water plants, three being adventive species. Ninety-eight indigenous vascular plant species and five mosses are recorded.

PLANT COMMUNITIES

SAND DUNES

Sand dunes extend along the length of the coast examined but from Leithfield northwards the proportion of shingle increases until at Amberley beach the low ridges are composed almost entirely of shingle. Wall (1922, 1953) writing of the Canterbury coast and describing the struggle between native and alien floras said that nearest the sea the indigenous plants were still supreme and that pingao "occupies the front rank of the dunes and stands almost alone in its glory". Cockayne (1927) said that on the fore dunes pingao was the sole species and that "it extends over amazing areas by means of its very stout, flexible much branching stems".

We do not know how widespread Spinifex was but Wall (1922) recorded a large patch of male plants at South Beach, New Brighton and female plants were known at North Beach until the 1940's (Simpson 1974). Today the foredunes are dominated by marram grass (Ammophila arenaria), with other adventive herbaceous species including the composites Senecio elegans and S. glomeratus. Calystegia soldanella is present on the gentler, lower slopes of some dune areas and here too ice-plant, Carpobrotus edulis forms large mats in somes places. Spinifex is no longer present and pingao is known only from a few locations (see list) and never in any quantity.

On some marram dunes inland from the foredunes, as e.g., adjacent to the large salt marsh at Kairaki, the introduced wheatgrass, Agropyron junceiforme occupies much of the lower slopes.

SHRUB DUNES

These semi-stabilised dunes today are likewise almost totally vegetated by adventive species but Coprosma acerosa is

present on dunes from Leithfield to Waipara and Cassinia was noted from Sumner to Leithfield. Euphorbia glauca, recorded by Cockayne (1927) from this habitat, is no longer present, and no Pimelea arenaria was seen on this survey. Lupin, Lupinus arboreus is the dominant species on these dunes with various introduced herbs.

SAND HOLLOWS OR DUNE SLACKS

These areas are limited in extent and very much modified, especially where stabilisation of the hinterland has been most successful. Of the native species Carex pumila is still important but the sand gunnera, (Gunnera arenaria) is not now commonly found. Ranunculus acaulis is present in a few areas and some Mimulus repens grows here although it is more prolific along water channels through salt meadows, especially on the eastern shore of thje Brooklands lagoon.

In a few places the short turf-forming grass, Zoysia pungens is present and this is the habitat too for the two varieties of Schoenus concinnus but this species is not common. Here many species of introduced herbs dominate the scene. There may be various small grasses including harestail (Lagurus ovatus), the composites, catsear (Hypochaeris radicata), hawksbill, (Leontodon taraxacoides), hawkesbeard, (Crepis capillaris), scarlet pimpernel, (Anagallis arvensis), occasional thistles of various species, always a quantity of sorrel (Rumex acetosella), some Erodium cicutarium and Plantago species. Two species of sun orchid (Thelymitra) and Microtis unifolia grow here.

TIDAL LAGOON AND DUNE LAKES

There are two large tidal lagoons, one at Brooklands, south of the Waimakariri River and the other to the north of the Ashley River at Saltwater Creek. Dune lakes of varying size are north of Kairaki, at Woodend beach and just north of Leithfield the vegetation of sedges and rushes in the swampy vicinity of these areas of water is still predominantly of indigenous species (see Mason 1968).

SALT MEADOW

There is a large area at Kairaki, now closed to the sea, a small meadow at Brooklands bordering the Waimakariri estuary, also further south at Spencer Park and smaller areas elsewhere. This habitat is the least modified with few adventive plants appearing amongst the turf-forming, creeping native species.

LEPTOSPERMUM SCRUB

Cockayne (1911 photo No. 37) illustrated manuka heath in Canterbury saying that the heath could be almost pure Leptospermum scoparium or with a good deal of wild irishman (Discaria toumatou). Wall (1953) mentions that Mazus pumilio "grows best among the small manuka scrub", and drew attention to

a spineless variety of Discaria in the New Brighton dunes.

In our survey only occasional plants of Leptospermum were recorded in two localities and Discaria was seen only in one. There are no communities of Leptospermum remaining.

On the seaward side of the tidal lagoon at Brooklands, there are two large trees of ake-ake, Dodonaea viscosa and one of ngaio, Myoporum laetum growing in the shelter of the foredune. Both Dodonaea are seed bearing, one is 1.70 m high with a canopy spread of ca 3 m, the other is 3.65 m high with a spread of ca 3 m and the basal circumference of the trunk is 1.50 m. On the second specimen nine well developed branches only 50 cm from the base suggest that there has been some infill by sand. The Myoporum is ca 1.80 m high with a trunk circumference at the base of 1.80 m and a canopy spread of nearly 13 m. All three trees have split trunks which contribute to the spread of the branches. Seedlings around the ngaio noted on an earlier visit by R. Mason and G. Collett were not evident in November 1981. There is another Dodonaea on marram dunes behind the Kairaki Surf Club building but this may have been planted. The presence of these well established trees suggests that a mature woody coastal forest may have existed earlier at least on parts of this coast.

Baumea rubiginosa

We did not record this in the dune complex but it is known from a paddock behind Leithfield beach (Thompson 1976) and from the mouth of the Avon River and Awawai Reserve.

Eleocharis gracilis

Again not seen in this survey but recorded by J.B. Armstrong from the mouth of the Waimakariri and present today in damp ground near Chaneys (Thompson 1980).

Juncus holoschoenus

Reported from Chaneys (Thompson 1979) but not seen in the dune complex.

Mazus pumilio

Not now present in the dune complex but known from behind Leithfield beach and in Chaney forest (Thompson 1980) and from Bottle Lake Reserve near Murphys Road.

Utricularia monanthos

We did not find this plant ourselves but it is reliably reported from eastern margin of the Brooklands lagoon by G.C. Collett, and in November 1982 reported by B.P.J. Molloy from the southern branch of the Waimakariri River near the Groynes.

Species which appear to have been lost to the area include Eleocharis neozelandica, although this small sedge is easily overlooked, Euphorbia glauca, Pimelea arenaria and Spinifex hirsutus, while Sebaea ovata and Spiranthes sinensis have not been seen since the 1940's. The Leptospermum/Discaria community is also no longer represented here.

Other uncommon sand dune species of the Canterbury coast have already been listed (Simpson 1981).

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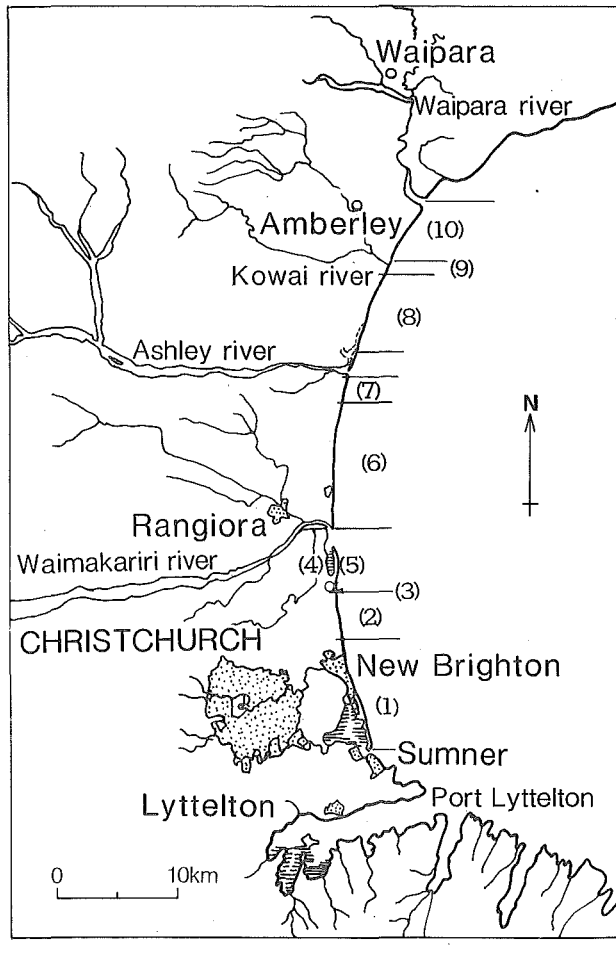
SITES



1. New Brighton Spit - Waimairi Beach
2. Waimairi Beach - North Avenue, Spencerville
3. Spencer Park
4. Spencer Park - Waimakariri inner side of lagoon
5. Spencer Park - Waimakariri outer side of lagoon
6. Kairaki - Woodend
7. Woodend - Waikuku
8. Saltwater Creek - Leithfield Beach
9. Leithfield - Kowai River
10. Kowai - Waipara River

PLANTS OF THE NORTH CANTERBURY COASTAL DUNE SYSTEM

(New Brighton Spit to Waipara River)

Plant names in accordance with useage in the references cited below unless otherwise indicated.

KEY

* See notes in the text
\+ indigenous species
a very abundant
b moderately common
c rare

	site:	1	2	3	4	5	6	7	8	9	10
	FERNS										
+	Blechnum procerum		c								
+	" minus						c	c			
+	" penna-marina		c								
+	Pteridium esculentum							c	b		
	GRASSES										
	Agropyron junceiforme (A. & D. Love) A. & D. Love	a			a		a				
	" repens (L.) Beauv.				b					b	b
	Agrostis stolonifera L.		b		a		b	b			b
	" tenuis Sibth. (capillaris L.)	c					c				
	Aira caryophyllea L.										c
	Ammophila arenaria (L.) Link	a	a	a	a	a	a	a	a	a	a
	Arrhenatherum elatius (L.) J.S. & C. Presl.		b								
	Bromus catharticus Vahl. (wildenowii Kunth)	b	b	b			b			b	
	" diandrus Roth.	b	b		b	b					
	" mollis L.	b			b					b	
+	Cortaderia richardii (Endl.) Zotov	b					b				
	Dactylis glomerata L.				c						
+	Deyeuxia billardieri (R. Br.) Kunth					c					
	Elymus arenarius L.	c									
+	" laevis (Petrie) Love & Connor								c		
	" rectisetus (Nees) Love & Connor										c
	Festuca arundinacea Schreber	b	b		b		b		b	b	b
	Glyceria maxima (Hartman) Holmb.									c	
	Holcus lanatus L.	b	b		b	b	b	b	b	b	b

	site:	1	2	3	4	5	6	7	8	9	10
+	Lachnagrostis filiformis Trin. var. semiglabra (Hackel) Zotov						c		c		
	Lagurus ovatus L.		b	b						b	b
	Nassella trichotoma (Nees) Arechuv								c		
	Parapholis strigosa (Dumort.) C.E. Hubb.				c		c			c	
	Poa annua L.	c	c		c						
+	" caespitosa Sprengel non Poir								c		
	" pratensis L.			c							
+	Puccinellia stricta (Hook. f.) Blom	c			c	c	c		c		
	Vulpia myuros (L.) Gmelin		b	b							
+	Zoysia minima (Col.) Zotov								c		c
	RUSHES AND SEDGES										
+	Baumea rubiginosa*										
	Carex buchanani					b			b		b
+	" coriacea	b	b	b	b			b		b	b
+	" flagellifera			c							
+	" inversa							c			
+	" lessoniana								c		
+	" litorosa	c		c				c	c		
+	" pumila	a	a	a	c	b	b	b	a		c
+	" secta							c			
+	" testacea								c		c
+	" virgata			c							
+	Desmoschoenus spiralis	c		c		c					
+	Eleocharis acuta							c			
+	" gracilis*										
	Juncus articulatus		b					b			
	" bufonius	c	c		c			c			
+	" caespiticius					c					
+	" distegus				c						
	" effusus							c	c		
	" gerardii								c		
+	" holoschoenus*										
+	" maritimus var. australiensis	a			a	a	a		a	a	a
+	" pallidus	b	b		b		b		b		
+	" planifolius					c				c	
	" tenuis		c								
+	Lepidosperma australe			c	c		c				c
+	Leptocarpus similis	a		a	a	a	a		a		b
+	Luzula sp.	c									
+	Schoenus nitens var. concinnus				c	c			c		
+	" " var. nitens								c		
+	Scirpus basilaris	c	c	c							c
+	" caldwellii				b		b	b	b	b	b
+	" cernuus	b	b	b	b		b		b		b
+	" nodosus	b			b		b		b	b	b
+	" pungens	b	b	b	b	b	b		b		b

	site:	1	2	3	4	5	6	7	8	9	10
ORCHIDS											
+	Microstis unifolia			a			b		b		
+	Spiranthes sinensis subsp. australis*										
+	Thelymitra pauciflora			c							
+	" longifolia			c							
FORBS											
	Acaena agnipila var. aequispina								c		
+	" anserinaefolia					c					
+	" novae-zelandiae	c								c	
	Achillea millefolium L.	b	b		b				b	b	b
	Alyssum alyssoides				c					c	
	Anagallis arvensis		c								
+	Apium australe	b			b	b			b	b	
	Aster sp.									c	
+	Atriplex hastata	b			b				b	b	b
+	" sp.								c		
	Bellis perennis			c							
	Bidens frondosa							b			
	Brassica sp.		c								
	Cakile edentula									c	
+	Calystegia sepium		c								
+	" soldanella		a		a	a			a	a	
	Capsella bursa-pastoris		c								
	Carduus tenuiflorus Curt.		c								
	Carpobrotus edulis	b	b		b	b			b	b	b
	Centaurium erythraea		c		c	c	c				
	Cerastium glomeratum		c								
	Chenopodium album		c								c
+	" ambiguum	b				b	b		b	b	b
	Chrysanthemum maximum Ramond	c			c						
	Cirsium arvense (L.) Scop.		b		b		b	b		b	b
	" vulgare (Savi) Ten.		b		b	b		b	b	b	
	Conium maculatum	b	c				c			c	
+	Cotula coronopifolia	b	b		b	b	b	b	b		
+	" dioica	b			c	c			c		
	Crepis capillaris	b	b		b				b	b	b
	" setosa						c				
+	Disphyma australe	b									
	Echium vulgare										c
+	Epilobium billardierianum subsp. billardierianum	c							c		
+	" billardierianum subsp. cinereum	b	b	b		b	b	b		b	
	" ciliatum		b					b			
+	" pallidiflorum							b			
	Erigeron canadensis L.	a	a		a	a			a	a	
	Erodium cicutarium										b
	Eschscholtzia californica	c									
	Fumaria officinalis		c								

	site:	1	2	3	4	5	6	7	8	9	10
	Galium aparine	c	c		c	c		c		c	
	" palustre							c			
+	Gnaphalium luteo-album		b			b	b			b	
+	Gunnera arenaria			b			c			c	
+	Hydrocotyle novae-zelandiae							b			
	Hypericum perforatum					c					
	Hypochaeris glabra L.					b				b	
	" radicata L.	a	a		a	a	a		a	a	
	Lathyrus sp.									c	
	Lavatera cretica	b	b								
	Leontodon taraxacoides (Vill.) Merat.		a			a		a	a		a
	Lepidium africanum	b	b								
	" hyssopifolium	b	b		b					b	b
+	Lilaeopsis novae-zelandiae				b				b	b	b
+	Limosella lineata	c			c						c
	Lotus tenuis				b	b					
	" pedunculatus							b		b	
	Malva nicacensis		c								
	Malva sylvestris	c									
	Matricaria matricarioides (Less.) Porter	b	b								b
+	Mazus pumilio*										
+	Microseris scapigera	c							c		
	Montia perfoliata		b	b		b					
+	Mimulus repens	b			b		b		b		
	Myosotis sp.							c			
	Nasturtium microphyllum	c						c		c	
	Oenothera stricta		b			b	b	b	b	b	b
	Orobanche minor	b								b	
	Oxalis debilis var. corymbosa		c								
	Parentucellia viscosa		b		b		b		b	b	
+	Phormium tenax	b		b	b	b		b	b	b	b
	Plantago australis		c								
	" coronopus	b			b	b	b		b		
	" lanceolata		c				c			c	c
	" major		c				c	c			
	Polycarpon tetraphyllum	b	b								b
	Polygonum aviculare		b		c						
	" hydropiper							b			
	" persicaria							b			
	" sp.										c
+	Potentilla anserinoides		b					b	b		
	Prunella vulgaris							c			
+	Ranunculus acaulis			c	c		c				
	" acris L.							c			
+	" macropus							c		c	
+	" rivularis							b			
	" repens L.		b					b			
	" sclereratus L.		c					c		c	
+	Rorippa paustris (L.) Besser							c			
	Rumex acetosella	b	b	b	b	b	b			b	b
	" conglomeratus	b					b			b	
	" crispus	b	b		b	b	b			b	b
	" obtusifolius	c	c								

	site:	1	2	3	4	5	6	7	8	9	10
	Sagina procumbens		c					c			
+	Salicornia australis	b			b	b	b		b		
+	Samolus repens	b			b	b	b		b		
+	Sebaea ovata*										
+	Selliera radicans	b	b		b	b	b		b	b	
	Senecio elegans L.	a	a		a	a			b	b	b
+	" glomeratus Desf. ex Poiret	b	a		a	b	b	b	b	b	
	" jacobaea L.					c					
	" vulgaris L.	b	b								
	Silene gallica	c									c
	Sisymbrium officinale	b	b		b						b
	" orientale		c								
	Sisyrinchium angustifolium	c		c							
	Solanum dulcamara		c		c		c	c			
+	" laciniatum	c								c	
	" nigrum					c					
	" sarrachoides			c						c	c
	Sonchus asper (L.) Hill		c			c					
	" oleraceus L.	a	a		a	a	a	a		a	a
+	Spergularia media	a			a	a	a		a		
	Stellaria media	c	c				c	c		c	
+	Suaeda maritima	b			b						
	Taraxacum officinale Weber		c								
	Tragopogon porriflorus L.								c		
+	Tetragonia tetragonioides	c							c		
+	Triglochin striatum	b			b		b		b		
	Trifolium arvense		b	b	b		b		b		
	" dubium		c								
	" fragiferum				b		b		b		
	" pratense		c				c				
	" repens		b		b		b				
	Tripleurospermum maritimum (L.) Koch subsp. inodorum (L.) Hyl.	c	c								
+	Typha orientalis		b		b			b	b	c	c
+	Urtica linariifolia						b	b	c		c
+	Utricularia monanthos*										
	Veronica americana							b			
	" anagallis-aquatica							b			
	" arvensis	c	c								
	Vicia angustifolia	b	b		b				b	b	
	" sativa	b					b			b	
	SHRUBS, TREES AND CREEPERS										
	Alnus glutinosa				c	c			c		
+	Cassinia leptophylla	b			b		b				
+	" fulvida	b			b	b				b	
	Chrysanthemodes monolifera	c								c	
+	Coprosma acerosa								c	c	c
+	" propinqua							b			
+	" repens (naturalized)	c									
+	Cordyline australis									c	
	Cupressus macrocarpa	c	c			c					c

	site:	1	2	3	4	5	6	7	8	9	10
	Cytisus proliferus	b									
+	Discaria toumatou								c		
+	Dodonaea viscosa					c	c				
	Eucalyptus sp. (? planted)						c				
	Euonymus europaens								c	c	
	Lavatera arborea	c									
+	Leptospermum scoparium					c			c		
	Lupinus arboreus	a	a	a	a	a	a	a	a	a	a
	Lycium ferocissimum	b			b					b	
+	Muehlenbeckia complexa									b	
+	Myoporum laetum			c		c					
	Pinus pinaster		c			c				c	
	" radiata	c	b		c	c	c	c	c		
+	Plagianthus divaricatus	b		b	b	b			b		b
	Populus alba		b	b							
	" nigra cultivar. "italica"	b									
	" giliadensis			b						c	
	Prunus sp. (damson)						c				
	Rosa rubiginosa				c	c	c				
	Rubus fruticosus		b			b					
	" laciniatus						b				
	Salix cinerea	b	b				b			b	
	" fragilis	b	b		b	c		b		b	
	Sambucus nigra	b	b		b	c	b	b	b	b	
	Sarothamnus scoparius	b	b		b		b	b	b	b	b
	Tamarix sp.	c	c	c	c	c	c	c		c	
	Ulex europaeus	b			b	c	c		c	c	c

WATER PLANTS

+	Azolla rubra							c		c	
+	Callitriche petriei							c			
	" stagnalis							b			
	Elodea canadensis									c	
+	Lemna minor							b		c	
+	Myriophyllum propinquum							b			
+	Nitella sp.								c	c	
+	Potamogeton cheesemanii							b			
	" crispus									c	
+	Ruppia polycarpa				c				c	c	c
+	Wolffia australiana							c		c	
+	Zostera muelleri				c				c		

MOSSES

+	Ceratodon purpureus				c						
+	Drepanocladus aduncus				c						
+	Hypnum cupressiforme				b						
+	Ptychomnion aciculare				c						
+	Thuidium furforosum				b						

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